



## Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

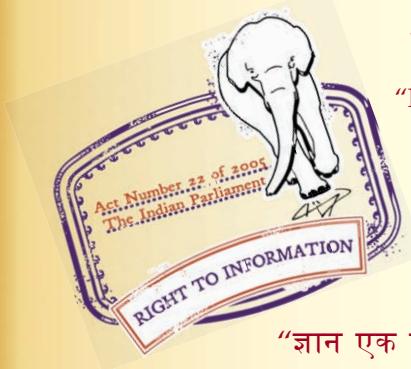
“Step Out From the Old to the New”

IS 8507-2-1 (1981): Fixed insulated hermetically sealed tantalum capacitors with solid electrolyte, Part 2: Type FCST 1, Section 1: Polar [LITD 5: Semiconductor and Other Electronic Components and Devices]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”





BLANK PAGE



PROTECTED BY COPYRIGHT

Indian Standard



**SPECIFICATION FOR  
FIXED, INSULATED, HERMETICALLY SEALED  
TANTALUM CAPACITORS WITH SOLID ELECTROLYTE**

**PART II TYPE FCST 1**

**Section 1 Polar**

**0. General** — This standard shall be read in conjunction with IS : 8507 ( Part I )-1977 ' Specification for fixed, insulated, hermetically sealed tantalum capacitors with solid electrolyte : Part I General requirements and methods of tests '.

**1. Outline Drawing and Dimensions** — The outline drawing and dimensions shall be according to Fig. 1 and Table 1.

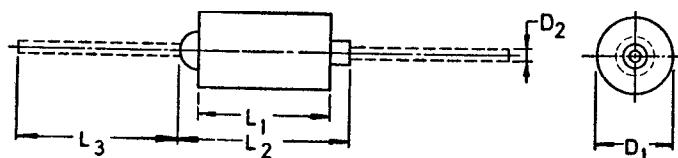


FIG. 1 POLAR SOLID TANTALUM CAPACITOR

**Note 1** — The case insulation extends 0.38 mm beyond each end. However, when a shrink fitted insulation is used, it laps over the ends of the capacitor body.

**Note 2** — The termination shall consist of tin-lead coated nickel wire.

TABLE 1 DIMENSIONS

Dimensions, mm

Case Size	$L_1$ $\pm 0.79$	$L_2$ ( Max )	$L_3$ ( Min )	$D_1$ $+0.41$ $-0.38$	$D_3$
( 1 )	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )
A	7.26	10.72	31.75	3.43	$0.50 \pm 0.05$
B	12.04	15.49	31.75	4.70	$0.50 \pm 0.05$
C	17.42	20.88	31.75	7.34	$0.60 \pm 0.06$ —0.05
D	19.96	23.42	31.75	8.92	$0.60 \pm 0.06$ —0.05

**2. Ratings and Characteristics**

- a) Rated capacitance *see 4.1 of IS : 8507 ( Part I )-1977*
- b) Selection tolerance  $\pm 5, \pm 10, \pm 20$  percent
- c) Rated voltage ( $U_R$ ) *see Table 2*
- d) Category voltage ( $U_C$ ) *see Table 2*
- e) Surge voltage ( $U_S$ ) *see Table 2*
- f) Rated temperature 85°C
- g) Vibration 10-2 000 Hz, 200 m/s<sup>2</sup>, 3 × 4 h
- h) Bump 4 000, 400 m/s<sup>2</sup>
- j) Shock 1 km/s<sup>2</sup>
- k) Acceleration 1 km/s<sup>2</sup>
- m) Climatic category 85/125/56 [ *see Appendix A of IS : 589-1961 Basic climatic and mechanical durability tests for components for electronic and electrical equipment ( revised )* ]
- n) Low air pressure 2 kPa

Adopted 1 June 1981

© February 1982, ISI

Price, Rs 6.00

TABLE 2 RATED VOLTAGE (  $U_R$  ), CATEGORY VOLTAGE (  $U_C$  ) AND SURGE VOLTAGE (  $U_S$  )

$U_R$ ( at 85°C ) V ( 1 )	$U_C$ ( at 125°C ) V ( 2 )	$U_S$ ( at 85°C ) V ( 3 )
6·0	4	8
10	7	13
15	10	20
20	13	26
35	23	46
50	33	65
75	50	98
100	67	130

3. **Marking** — See 7 of IS : 8507 ( Part I )-1977.

4. **Construction and Workmanship** — See 5 of IS : 8507 ( Part I )-1977.

5. **Classification of Tests** — See 8.1 of IS : 8507 ( Part I )-1977.

5.1 **General Conditions for Tests** — See 8.2 of IS : 8507 ( Part I )-1977.

5.1.1 The test schedule and requirements shall be in accordance with Table 3.

TABLE 3 TEST SCHEDULE AND REQUIREMENTS

SI No.	Test ( 2 )	Clause Ref in IS : 8507 ( Part I )-1977 ( 3 )	Condition of Test ( 4 )	Requirement ( 5 )
( 1 )	i) <i>All Samples</i>			
	a) Visual examination	8.4.1	—	The workmanship and finish shall be satisfactory. The marking shall be legible
	b) Dimensions	8.4.2	—	The dimensions of the capacitors and their terminations shall conform to values given in Table I used with Fig. 1
	c) Capacitance	8.3.2	—	The capacitance value shall correspond with the rated capacitance taking into account the tolerance
	d) Tangent of loss angle	8.3.3	—	The value shall not exceed : <i>Rated Voltage</i> <i>Tan δ</i> 6·3 & 10 V      8 percent 15 & 20 V      6 percent 35 V      4 percent
	e) Leakage current	8.3.1	—	Leakage current at $25 \pm 2^\circ\text{C}$ shall not exceed $0\cdot02 \mu\text{A}/\mu\text{E-V}$
	f) Voltage proof	8.3.4	—	There shall be no breakdown or flashover
	g) Insulation resistance	8.3.5	—	Insulation resistance shall not be less than $1\,000\text{ M}\Omega$
	h) Sealing	8.4.10	—	There shall be no leakage of electrolyte and bubbling of gas when fully immersed in the solution
ii) <i>First Group</i>				
	a) Solderability	8.4.4	—	The tinning shall be uniform and good
	b) Robustness of terminations	8.4.3	—	—
	1) Visual examinations	8.4.1	—	There shall be no damage
	c) Bump	8.4.6	4 000, 400 $\text{m/s}^2$	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent from the value recorded in ( i ) ( c )
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
	d) Vibration	8.4.5	10·2 000 Hz, 200 $\text{m/s}^2$ , $3 \times 4\text{ h}$	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent from the value recorded in ( i ) ( c )
	3) Tangent of loss angle	8.3.3	—	—
	4) Leakage current	8.3.1	—	As per initial limits

( *Continued* )

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — Contd

SI No.	Test	Clause Ref in IS : 8507 ( Part I )-1977	Condition of Test	Requirement
( 1 )	( 2 )	( 3 )	( 4 )	( 5 )
e)	Shock	8.4.7	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent from the value recorded in ( i ) ( c )
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits
f)	Acceleration ( steady state )	8.4.8	1 km/s <sup>2</sup> Rigidly mounted using brackets	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent from the value recorded in ( i ) ( c )
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits
g)	Rapid change of temperature	8.5.3	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent from the value recorded in ( i ) ( c )
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits
h)	Climatic sequence	8.5.1	—	—
1)	Dry heat	8.5.1.2	At maximum category temperature ( $+125^{\circ}\text{C}$ ) for 16 h	—
2)	Damp heat ( accelerated )	8.5.1.3	—	—
i)	Visual examination	8.4.1	—	There shall be no damage
3)	Cold*	8.5.1.4	At minimum category temperature ( $-55^{\circ}\text{C}$ ) for 2 h	—
i)	Visual examination	8.4.1	—	There shall be no damage
4)	Low air pressure	8.5.1.5	2 kPa	There shall be no short circuit
5)	Damp heat ( accelerated ) remaining cycles	8.5.1.6	—	—
i)	Visual examination	8.4.1	—	There shall be no damage
ii)	Voltage proof	8.3.4	—	There shall be no breakdown or flashover
iii)	Insulation resistance	8.3.5	—	1 000 M $\Omega$ Min
iv)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent
v)	Tangent of loss angle	8.3.3	—	As per initial limits
vi)	Leakage current	8.3.1	—	As per initial limits
iii)	<i>Second Group</i>			
a)	Damp heat ( long term )	8.5.2	To one half of the specimens rated voltage shall be applied	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Voltage proof	8.3.4	—	There shall be no breakdown or flashover
3)	Insulation resistance	8.3.5	—	1 000 M $\Omega$ Min
4)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent
5)	Tangent of loss angle	8.3.3	—	As per initial limits
6)	Leakage current	8.3.1	—	As per initial limits
iv)	<i>Third Group</i>			
a)	Endurance	8.7	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed $\pm 2$ percent
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits

\*During the last 10 minutes of the period of exposure the rated voltage shall be applied to the specimens. No short circuit shall occur.

( Continued )

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — *Contd*

SI No.	Test	Clause Ref in IS : 8507 ( Part I )-1977	Condition of Test	Requirement
(1)	( 2 )	( 3 )	( 4 )	( 5 )
	5) Voltage proof	8.3.4	—	There shall be no breakdown or flashover
	6) Insulation resistance	8.3.5	—	1 000 MΩ Min
v)	<i>Fourth Group</i>			
	a) Mould growth	8.5.5	—	There shall be no mould growth visible to naked eye
vi)	<i>Fifth Group</i>			
	a) Resistance to soldering heat	8.4.4.2	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ±5 percent
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
	b) Resistance to solvents	8.4.9	—	—
	1) Visual examination	8.4.1	—	The marking shall be legible and shall not rub off. There shall be no damage
vii)	<i>Sixth Group</i>			
	a) Characteristics at low and high temperature	8.6	—	—
	<i>Step 1 at 25°C</i>			
	1) Capacitance	8.3.2	—	As per initial limits
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	<i>Step 2 at -55°C</i>			
	1) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ±10 percent from the value recorded at Step 1
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	<i>Step 3 at 25°C</i>			
	1) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ±2 percent from the value recorded at Step 1
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	3) Leakage current	8.3.1	—	As per initial limits
	<i>Step 4 at +85°C</i>			
	1) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ±8 percent from the value recorded at Step 1
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	3) Leakage current	8.3.1	The category voltage shall be applied	As per initial limits
	<i>Step 5 at +125°C</i>			
	1) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ±12 percent from the value recorded at Step 1
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	3) Leakage current	8.3.1	—	As per initial limits
	<i>Step 6 at 25°C</i>			
	1) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ±2 percent from the value recorded at Step 1
	2) Tangent of loss angle	8.3.3	—	As per initial limits
	3) Leakage current	8.3.1	—	As per initial limits
b)	<i>Surge</i>			
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ±2 percent
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
c)	<i>Salt mist</i>			
	1) Visual examination	8.4.1	4 days	—
	2) Leakage current	8.3.1	—	There shall be no corrosion or any other damage
				As per initial limits